

DT05 Rec'd PCT/PTO 27 JAN 2005

Annexes(amended sheets of the description & claims)

(1)

That is, a main object of the present invention is to provide a thermal insulation foamed sheet by forming a foaming plane made of a foamed cell group through foaming of a synthetic resin film mainly using moisture contained in base paper and by keeping the foaming height of this foaming plane by vacuum-suctioning, a thermal insulation foamed container using this and method for producing the same.

#### Description of the Invention

For the thermal insulation foamed sheet according to the present invention, a sheet in which a synthetic resin film is laminated on base paper is heated, a foaming plane made of a foamed cell group is formed by foaming the synthetic resin film mainly using moisture contained in base paper, and the expansion ratio of the foaming cells is increased by at least a part is vacuum-suctioned in a die whose size is set so that a gap for suctioning a foaming cell is generated between said forming plane and suctioning surface provided in the die so that the synthetic resin film can be foamed using the moisture contained in the base paper and the high expansion ratio can be maintained by vacuum-suctioning the foaming cells so as to prevent contraction of the foaming cells foamed at a high expansion ratio.

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Also, it is preferable that at least a part of said foaming plane is vacuum-suctioned so that a part of foaming cells in the foamed cell group is floated and adjacent foaming cells are stuck together so that the apparent foaming height is made equal. Said foaming plane is formed on the whole or a part of the sheet.

By this, the high expansion ratio can be maintained by preventing contraction of the foaming cells foamed at a high ratio.

Also, since the foaming plane is formed by heating and vacuum-suctioning, the heating temperature can be lowered and the heating time can be reduced. And moreover, deodorization of odors of ink, solvents, resin or lamination can be performed at the same time by vacuum-suctioning.

With the thermal insulation foamed container using the thermal insulation foamed sheet of the present invention, said thermal insulation foamed sheet is used at least on the body section of the container, and insulation efficiency is improved by high foaming height, and its feeling can be made better.

In the case of the thermal insulation foamed container having said foaming plane at least on the body section, a synthetic resin film is laminated on at least one side of base paper with the other side also subjected to lamination, and the body section or the container is heated so as to form a foaming plane made of a foamed cell group by foaming

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Also, it is preferable that at least a part of said foaming plane is vacuum-suctioned so that a part of foaming cells in the foamed cell group is floated and adjacent foaming cells are stuck together so that the apparent foaming height is made equal. Said foaming plane is formed on the whole or a part of the sheet.

By this, the high expansion ratio can be maintained by preventing contraction of the foaming cells foamed at a high ratio.

Also, since the foaming plane is formed by heating and vacuum-suctioning, the heating temperature can be lowered and the heating time can be reduced. And moreover, deodorization of odors of ink, solvents, resin or lamination can be performed at the same time by vacuum-suctioning.

With the thermal insulation foamed container using the thermal insulation foamed sheet of the present invention, said thermal insulation foamed sheet is used at least on the body section of the container, and insulation efficiency is improved by high foaming height, and its feeling can be made better.

In the case of the thermal insulation foamed container having said foaming plane at least on the body section, a synthetic resin film is laminated on at least one side of base paper with the other side also subjected to lamination, and the body section or the container is heated so as to form a foaming plane made of a foamed cell group by foaming

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foamed container having said foaming plane at least on its body section is comprised of a step of forming a foaming plane made of a foamed cell group by foaming a synthetic resin film mainly using moisture contained in base paper, on both sides of which are laminated, through heating, and a step of increasing the foaming height of the foaming cell by at least a part is vacuum-suctioned in a die whose size is set so that a gap for suctioning a foaming cell is generated between said forming plane and a suctioning surface provided in the die.

And in the above vacuum-suctioning, it is preferable to provide a step of constraining the sheet on which a foaming plane is formed at a predetermined position in a die to prevent it from being moved or deformed but an even suctioning force is applied on the foaming plane.

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CLAIMS

1. A thermal insulation foamed sheet characterized by that a sheet in which a synthetic resin film is laminated on base paper is heated, a foaming plane made of a foamed cell group is formed by foaming the synthetic resin film mainly using moisture contained in the base paper, and the foaming height of the foaming cells is increased by at least a part is vacuum-suctioned in a die whose size is set so that a gap for suctioning a foaming cell is generated between said foaming plane and a suctioning surface provided in the die.
2. A thermal insulation foamed sheet in claim 1, wherein the foamed cell group is made of foaming cells adhering to the base paper.
3. A thermal insulation foamed sheet in claim 1, wherein the foamed cell group is made of the foaming cells adhering to the base paper and the foaming cells separated and floated from the base paper and the adjacent foaming cells stuck together to make the apparent foaming height even.
4. A thermal insulation foamed sheet in claim 1, wherein said foaming plane is formed on a part of the sheet.
5. A thermal insulation foamed sheet in claim 1, wherein a constraint means for constraining the sheet on which a foaming plane is formed at a predetermined position in a die to prevent it from being moved or deformed so that an even suctioning force is applied on the foaming plane at vacuum-suctioning.

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6. A thermal insulation foamed container characterized by that the thermal insulation foamed sheet in any of claims 1 through 5 is used at least at a body section of the container.

7. A thermal insulation foamed container having a foaming plane at least at its body section characterized by that a synthetic resin film is laminated on at least one side of base paper with the other side also subjected to lamination, and the body section or the container is heated so as to form a foaming plane made of a foamed cell group by foaming said synthetic resin film mainly using moisture contained in the base paper, and at least a part is vacuum-suctioned in a die whose size is set so that a gap for suctioning a foaming cell is generated between said foaming plane and a suctioning surface provided in the die so as to increase the foaming height of the foaming cell.

8. A thermal insulation foamed sheet in claim 7, wherein the foamed cell group is made of foaming cells adhering to the base paper.

9. A thermal insulation foamed sheet in claim 7, wherein the foamed cell group is made of the foaming cells adhering to the base paper and the foaming cells separated and floated from the base paper, and the adjacent foaming cells stuck together to make the apparent foaming height even.

10. A thermal insulation foamed container in claim 7, wherein said foaming plane is formed on a part of the body section or a part of the container.

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11. A thermal insulation foamed container in claim 7, wherein a constraint means for constraining the sheet on which a foaming plane is formed at a predetermined position in a die to prevent it from being moved or deformed so that an even suctioning force is applied on the foaming plane at vacuum-suctioning.

12. A method for producing a thermal insulation foamed sheet comprised of a step of forming a foaming plane made of a continuous foamed cell group by heating a sheet in which a synthetic resin film is laminated on base paper and by foaming the synthetic resin film mainly using moisture contained in the base paper, and a step of increasing the foaming height of the foaming cell by at least a part is vacuum-suctioned in a die whose size is set so that a said foaming plane and a suctioning surface provided in the die.

13. A method for producing a thermal insulation foamed sheet in claim 12, wherein the foamed cell group is made of foaming cells adhering to the base paper.

14. A method for producing a thermal insulation foamed sheet in claim 12, wherein the foamed cell group is made of the foaming cells adhering to the base paper and the foaming cells separated and floated from the base paper, and the adjacent foaming cells stuck together to make the apparent foaming height even.

15. A method for producing a thermal insulation foamed sheet in claim 13, wherein a step is provided to constrain the sheet in which the foaming plane is formed at a

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predetermined position in a die to prevent it from being moved or deformed so that an even suctioning force is applied on the foamed surface at vacuum-suctioning.

16. A method for producing a thermal insulation foamed container having a foaming plane at least on a body section comprised of a step of forming a foaming plane made of a foamed cell group by foaming a synthetic resin film in which the both sides of base paper is laminated mainly using moisture contained in the base paper through heating, and a step of increasing the foaming height of the foaming cell by at least a part is vacuum-suctioned in a die whose size is set so that a gap for suctioning a foaming cell is generated between said foaming plane and a suctioning surface provided in the die.

17. A method for producing a thermal insulation foamed sheet in claim 16, wherein the foamed cell group is made of foaming cells adhering to the base paper.

18. A method for producing a thermal insulation foamed sheet in claim 16, wherein the foamed cell group is made of the foaming cells adhering to the base paper and the foaming cells separated and floated from the base paper, and the adjacent foaming cells stuck together to make the apparent foaming height even.

19. A method for producing a thermal insulation foamed container in claim 16, wherein a step is provided to constrain the sheet in which the foaming plane is formed at a predetermined position in a die to prevent it from being

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moved or deformed so that an even suctioning force is  
applied on the foaming plane at vacuum-suctioning.

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